Diane Roy
Vice President, Regulatory Affairs

Gas Regulatory Affairs Correspondence
Email: gas.regulatory.affairs@fortisbc.com

Electric Regulatory Affairs Correspondence
Email: electricity.regulatory.affairs@fortisbc.com

FortisBC
16705 Fraser Highway
Surrey, B.C. V4N 0E8
Tel: (604)576-7349
Cell: (604) 908-2790
Fax: (604) 576-7074
www.fortisbc.com

May 16, 2022

City of Richmond
6911 No. 3 Road
Richmond, B.C
V6Y 2C1

Attention: Mr. Anthony Capuccinello Iraci

Dear Mr. Capuccinello Iraci:

Re: FortisBC Energy Inc. (FEI)

Revised Renewable Gas Program Application – Stage 2 (Application)

Response to the City of Richmond, the City of Surrey, the District of North Vancouver, the District of Saanich, the City of Victoria and Lulu Island Energy Company Ltd. (collectively City of Richmond or CoR) Information Request (IR) No. 1

On December 17, 2021, FEI filed the Application referenced above. In accordance with the amended regulatory timetable established in British Columbia Utilities Commission Order G-103-22, FEI respectfully submits the attached response to the CoR IR No. 1.

For convenience and efficiency, FEI has occasionally provided an internet address for referenced reports instead of attaching lengthy documents to its IR responses. FEI intends for the referenced documents to form part of its IR responses and the evidentiary record in this proceeding.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Diane Roy

Attachments

cc (email only): Commission Secretary
Registered Parties

A. PROPOSED RENEWABLE GAS PROGRAM

1.0 Reference: PROPOSED RENEWABLE GAS PROGRAM
Exhibit B-11 (the " Application"), Section 7.4, p. 97
Revised Renewable Gas Program

On page 97 of the Application, FEI states the following:

> "FEI is proposing to begin providing a Renewable Gas Blend whereby all customers who purchase their gas from FEI (i.e. sales customers) [footnote omitted] will receive a percentage of their gas supply as Renewable Gas."

1.1 Please fill out the following table to clarify what constitutes "sales customers" and the relationship to FEl 's total throughput for 2020. The table groups several rows to indicate what we understand to constitute "FEI Sales Customers" but if this is inaccurate please provide a corrected table which groups together "sales customers" and indicates what subset of customers will be receiving the Renewable Gas Blend. Please add any rows which are required to fully capture FEl's throughput. Throughput should reflect total gas sales including both conventional natural gas and RNG.

		2020 PJ	Receives Renewable Gas Blend (Y/N)	Pays S&T LC Rider (Y/N)
FEI Sales Customers	Residential Sales taking commodity from FEI			
	Commercial sales taking commodity from FEI			
	Industrial sales taking commodity from FEI			
	NGV taking commodity from FEI			
	Non-NGV taking commodity from FEI			
	Total to FEI Sales Customers			
	Residential sales taking commodity from gas marketers			

	Commercial sales taking commodity from gas marketers			
	Industrial sales taking commodity from gas marketers			
	NGV taking commodity from gas marketers			
	Non-NGV LNG taking commodity from gas marketers			
	T-Service (if not included in categories above)			
	Bypass and Special Rates (if not included in categories above)			
	Total Sales to Customers taking commodity from gas marketers, T-service, and bypass and special rates			
	Total FEI Throughput			

1

2 **Response:**

3 Please see the table below.

1 **Table 1: Sales and Transport Service Customers Volume and Relationship to Renewable Gas**

		2020 PJ	Receives Renewable Gas Blend (Y/N)	Pays S&T LC Rider (Y/N)
FEI Sales Customers	Residential Sales taking commodity from FEI	81.6	Y	Y
	Commercial sales taking commodity from FEI	53.3	Y	Y
	Industrial sales taking commodity from FEI	14.7	Y	Y
	NGV taking commodity from FEI	0.7	Y	Y
	Non-NGV taking commodity from FEI (RS 46)	1.4	N	N
	Total to FEI Sales Customers	**151.8**		
T-Service and Customer Choice Customers	Residential sales taking commodity from gas marketers (Customer Choice)	0.01	Y	Y
	Commercial sales taking commodity from gas marketers (Customer Choice)		Y	Y
	Commercial sales taking commodity from gas marketers (T-Service)	4.6	N	N
	Industrial sales taking commodity from gas marketers (T-Service)	65.6	N	N
	NGV taking commodity from gas marketers (T-Service)	0.3	N	N
	Non-NGV LNG taking commodity from gas marketers (T-Service)	0.3	N	N
	T-Service (if not included in categories above)		N	N
	Bypass and Special Rates (if not included in categories above)	12.34	N	N
	Total Customers taking commodity from gas marketers, T-service, and bypass and special rates	**83.0**		
	Total FEI Throughput	**234.77**		

2

1.2 Would FEI customers who are not interested in receiving the proposed Renewable Gas Blend and who currently purchase their gas commodity from FEI be able to avoid the bill impact of the proposed S& T LC Rider by switching to a gas marketer?

Response:

FEI has interpreted this question to be regarding gas marketers in the Customer Choice program offered to customers in Rate Schedules 1 to 3.

No, the S&T LC rider is charged to all sales customers, including those who use a gas marketer under the Commodity Unbundling program. This means that all sales customers, including those provided gas under the Commodity unbundling program will benefit from the Renewable Gas Program and will see their GHG emissions decrease.

1.3 Please fill out three versions of the following table, one for each of the years 2024, 2028 and 2032, based on FEI's assumptions used in the Application (or on any updated assumptions incorporated into FEI's response to BCUC IR1). Please convert and adjust units as needed – for example, the calculation in Line 4 must take into account unit conversions between PJ and GJ. For "Customer Group Contribution to Renewable Gas Acquisition Cost", please use the total contribution by each group of customers towards the cost of Renewable Gas supply, including revenues received via the S&T LC rider, via the LCG Charge, and any other relevant charges.

1		Renewable Gas Connections	Voluntary Renewable Gas (Ex NGV and T-Service)	Voluntary Renewable Gas (NGV)	Voluntary Renewable Gas (T-Service)	Renewable Gas Blend	Total
2	RG Volume (PJ)						
3	Weighted Average Supply Cost of Renewable Gas $/GJ						
4	Renewable Gas Cost by Customer Group [Line 2 x Line 3] $000s						

5	Customer Group Contribution to Renewable Gas Acquisition Cost $000s						
6	Over recovery (under recovery) [Line 5- Line 4] $000s						
7	Customer Group Contribution per GJ Renewable Gas Allocated to Customer Group [Line 5 / Line 2] $/GJ						

Response:

Please refer to the response to BCSEA IR1 11.1 where FEI corrected the demand for Renewable Gas Connections. FEI started with this corrected demand and provides the requested tables with some modifications for clarity below. Note that Renewable Gas Connections and Voluntary Renewable Gas (excluding T-Service) customers are also Renewable Gas Blend customers. Please also refer to the responses to BCUC IR1 13.2, 16.2 and 30.1 regarding how FEI's proposing pricing is consistent with long-standing ratemaking principles.

Table 1: Renewable Gas Demand and Cost Recovery Year 2024

	2024						
1		Renewable Gas Connections	Voluntary Renewable Gas (Ex NGV and T-Service)	Voluntary Renewable Gas (NGV)	Voluntary Renewable Gas (T-Service)	Renewable Gas Blend	Total
	RG Volume (TJ)						
	Delivered via LCG Charges (TJ)	3,064	3,325	1,400	275	-	8,064
	Delivered via S&T LC Rider (TJ)	114	123	-	-	5,276	5,513
2	Total Volume (TJ)	3,178	3,448	1,400	275	5,276	13,576
3	Weighted Average Supply Cost of Renewable Gas $/GJ	24.06	24.06	24.06	24.06	24.06	
4	Renewable Gas Cost by Customer Group [Line 2 x Line 3] $000s	76,451	82,967	33,672	6,616	126,939	326,646
	Cost Recovery ($000)						
	Cost Recovery via LCG Charges ($000)	24,092	49,768	33,672	6,616	-	114,148
	Cost recovery via S&T LC Rider ($000)	4,379	4,753	-	-	203,366	212,497
5	Total Cost Recovery ($000)	28,471	54,520	33,672	6,616	203,366	326,646
6	Over recovery under recovery) [Line 5- Line 4] $000s	(47,980)	(28,447)	-	-	76,427	-
7	Customer Group Contribution per GJ Renewable Gas Allocated to Customer Group [Line 5 / Line 2] $/GJ	8.96	15.81	24.06	24.06	38.55	24.06

Table 2: Renewable Gas Demand and Cost Recovery Year 2028

	2028						
1		Renewable Gas Connections	Voluntary Renewable Gas (Ex NGV and T-Service)	Voluntary Renewable Gas (NGV)	Voluntary Renewable Gas (T-Service)	Renewable Gas Blend	Total
	RG Volume (TJ)						
	Delivered via LCG Charges (TJ)	8,915	3,714	1,988	275	-	14,891
	Delivered via S&T LC Rider (TJ)	558	233	-	-	8,518	9,309
2	Total Volume (TJ)	9,473	3,946	1,988	275	8,518	24,200
3	Weighted Average Supply Cost of Renewable Gas $/GJ	23.93	23.93	23.93	23.93	23.93	
4	Renewable Gas Cost by Customer Group [Line 2 x Line 3] $000s	226,659	94,423	47,556	6,580	203,801	579,019
	Cost Recovery ($000)						
	Cost Recovery via LCG Charges ($000)	96,137	65,867	47,556	6,580	-	216,140
	Cost recovery via S&T LC Rider ($000)	21,760	9,065	-	-	332,055	362,879
5	Total Cost Recovery ($000)	117,896	74,932	47,556	6,580	332,055	579,019
6	Over recovery under recovery) [Line 5- Line 4] $000s	(108,763)	(19,491)	-	-	128,254	-
7	Customer Group Contribution per GJ Renewable Gas Allocated to Customer Group [Line 5 / Line 2] $/GJ	12.45	18.99	23.93	23.93	38.98	23.93

1

2 **Table 3: Renewable Gas Demand and Cost Recovery Year 2032**

	2032						
1		Renewable Gas Connections	Voluntary Renewable Gas (Ex NGV and T-Service)	Voluntary Renewable Gas (NGV)	Voluntary Renewable Gas (T-Service)	Renewable Gas Blend	Total
	RG Volume (TJ)						
	Delivered via LCG Charges (TJ)	14,625	4,197	2,172	275	-	21,268
	Delivered via S&T LC Rider (TJ)	1,990	571	-	-	17,671	20,232
2	Total Volume (TJ)	16,615	4,768	2,172	275	17,671	41,500
3	Weighted Average Supply Cost of Renewable Gas $/GJ	23.39	23.39	23.39	23.39	23.39	
4	Renewable Gas Cost by Customer Group [Line 2 x Line 3] $000s	388,550	111,497	50,783	6,431	413,232	970,493
	Cost Recovery ($000)						
	Cost Recovery via LCG Charges ($000)	179,067	80,740	50,783	6,431	-	317,022
	Cost recovery via S&T LC Rider ($000)	64,281	18,446	-	-	570,744	653,471
5	Total Cost Recovery ($000)	243,349	99,186	50,783	6,431	570,744	970,493
6	Over recovery under recovery) [Line 5- Line 4] $000s	(145,201)	(12,311)	-	-	157,512	-
7	Customer Group Contribution per GJ Renewable Gas Allocated to Customer Group [Line 5 / Line 2] $/GJ	14.65	20.80	23.39	23.39	32.30	23.39

3

4

2.0 Reference: ACCOUNTING TREATMENT, PROGRAM MECHANICS, RATE SETTING AND CUSTOMER BILL IMPACT

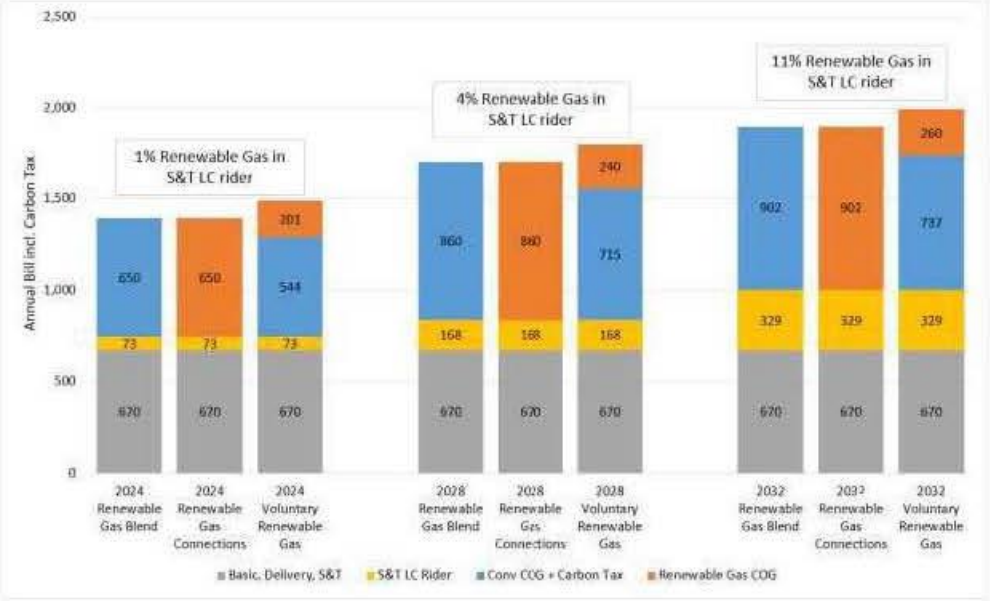
Exhibit B-11, Section 8.6, p. 123

Exhibit A-10, BCUC IR1, p. 50

Customer Bill Impacts

Figure 8-4 on page 123 in the Application shows bill impacts for RS1 customers in 2024, 2028 and 2032. BCUC IR1 42.2, 42.3 and 42.4 ask FEI to provide revised versions of Figure 8-4.

Figure 8-4: Annual Bill for Rate Schedule 1



2.1 Please confirm that Figure 8-4 in the Application shows bill impacts under the assumption that new RS1 customers and existing RS1 customers have the same average use per customer (UPC).

Response:

Confirmed. Figure 8-4 used the RS 1 average usage of 83.1 GJ per year. For purposes of calculating bill impacts, and as discussed in Section 8-6 of the Application, to isolate the impact to customers' bills from increasing Renewable Gas supply and changes in carbon tax, FEI has held all other rates at the current approved levels and held customer count, use per customer and total demand equal to those in FEI's Annual Review for 2021 Rates. The intention of Figures 8-4 through 8-6 is to illustrate that Renewable Gas Blend and Renewable Gas Connections customers will pay the same overall annual bill at the same use rates.

New residential customers generally have a lower use rate than all customers on average because buildings and appliances become more energy efficient over time. It is also true that both FEI's existing and new customers have wide-ranging use rates from less than 5 GJ to greater than 250 GJ depending on the number of gas use appliances, the efficiency of those appliances, the efficiency of their premise, and personal choices of how each of these appliances are used.

2.2 Given increased building efficiency requirement under the BC Step Code, does FEI expect that new RS1 customers in 2024, 2028, and 2032 will on average have the same UPC as existing RS1 customers?

Response:

Please refer to the response to City of Richmond IR1 2.1.

2.3 After revising Figure 8-4 as requested in BCUC IR1 42.2, 42.3 and 42.4, please provide another version of Figure 8-4 which includes the revisions requested by the BCUC, and has also been corrected to include the impact of using different UPC assumptions for existing customers, vs for new customers receiving the Renewable Gas Connections rate, as appropriate.

Response:

FEI was unable to fully respond to BCUC IR1 42.3 and 42.4. FEI was able to provide a graph in the response to BCUC IR1 42.2 showing bill impacts acquiring 55 PJ for Renewable Gas by 2030. As discussed in response to BCUC IR1 42.2, in revising Figures 8-4 to 8-6, FEI started with corrected Figures 8-4 to 8-6, added 2022 and 2030, made the adjustment to reach 55 PJ of Renewable Gas supply in 2030, and calculated the impact in real dollars.

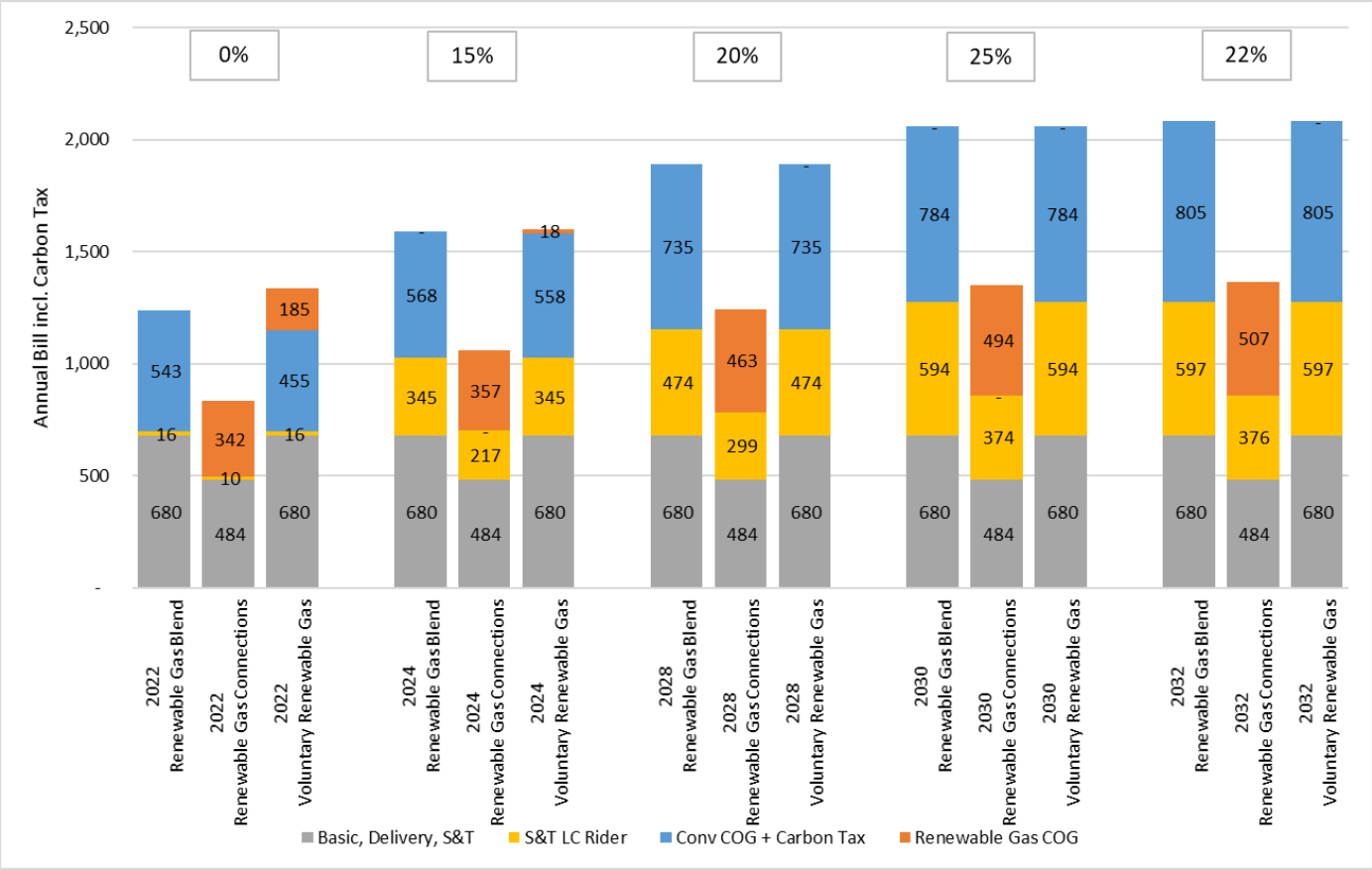
As discussed in the response to City of Richmond IR1 2.1, new and existing residential customers may have a number of different end points (e.g., cooktop, stove, hot water heater, furnace, etc.) with differing efficiencies, and therefore, each new and each existing customer will have very different usage profiles. However, for this response, FEI has used the average annual consumption for existing RS 1 customers of 84.8 GJ per year and 53.4 GJ per year for a new RS 1 customer.

In the figure below, the Renewable Gas Blend and Voluntary Renewable Gas service annual bills are based on the UPC of 84.8 GJ per year and assumes that these customers are existing

customers, while the Renewable Gas Connections annual bill uses the UPC of 53.4 GJ per year and assumes that these are new customers. The boxed percentages at the top of the figure are the percent of Renewable Gas delivered through the S&T LC rider. All annual bills are in 2022 real dollars, assuming a two percent inflation rate.

As expected when using a lower UPC, the annual bills for the Renewable Gas Connections customers (or any other customers) will be lower. FEI notes that this is also the case today for new customers consuming conventional natural gas.

Requested Figure 8-4: Annual Bill for Rate Schedule 1



2.3.1 For each year shown in the revised figure, please specify what UPC FEI has used for new customers and for existing customers, and what average level of Step Code performance this corresponds to for new customers.

Response:

FEI did not prepare the analysis based on Step Code performance levels, as Step Code measures are based on metrics such as TEDI, MEUI[1] and Air Changes per Hour (ACH) for homes constructed rather than a UPC measure. Moreover, as discussed below, any measure of comparison would not be meaningful to use.

The energy use to meet these metrics vary by several factors, including: floor area, equipment installed, building envelope, etc. Therefore, it is not meaningful to assign a Step Code level solely based on a UPC for a Rate Schedule class. Further complexity arises with the proposed analysis as there are five steps of the Step Code, the adoption of which varies across the Province. The Vancouver Building Bylaw also differs from the provincial Step Code.

For a discussion on the UPC forecast, please refer to the response to City of Richmond IR1 2.3.

2.4 When running an extension test for the purposes of determining the required Contribution in Aid of Construction for new RS1 connections (before any proposed subsidy from the System Extension Fund), does FEI use a backwards-looking UPC based on existing customers or does FEI use a forward-looking UPC based on the expected performance of new buildings (accounting for the impact of the Step Code), or some other value? Please explain.

Response:

The volume associated with a customer attachment within the test is not a forecast of what new customers are expected to consume. The volume is a per appliance credit input to the test that credits new customers with an amount of consumption equal to the average consumption of other existing customers on a per appliance basis. Consumption credits in the MX Test are determined by assigning a consumption value in GJ per year for each appliance the customer installs. This methodology has been reviewed and accepted by the BCUC.

The annual consumption per appliance is taken primarily from FEI's Residential End Use Study (REUS). As such, the MX Test inputs are regularly updated. The REUS contains a cross section of all users on the FEI natural gas distribution system, both new and existing. As newer more energy efficient customers come on to the system in larger and more frequent numbers, the lower consumption per appliance will be reflected in subsequent REUS and incorporated into the system extension inputs.

[1] TEDI is Thermal Energy Demand Intensity, MEUI is Mechanical Energy Use Intensity.

2.5 Does FEI anticipate any changes to its extension test to account for a) declining UPC for new connections consistent with the BC Step Code Requirements; and b) the cost of the proposed cross-subsidy for Renewable Gas for all new RS1 connections?

Response:

FEI disagrees with the premise of this IR that there is a cross-subsidy proposed for all new residential connections. Please refer to the responses to BCUC IR1 13.2 and 16.2. Please also refer to the response to City of Richmond IR1 2.4.

Declining UPC rates are reflected in declining consumption per appliance values as discussed in the response to City of Richmond IR1 2.4, and FEI would expect the BC Step Code Requirements to affect those values.

2.6 Does FEI anticipate the proposed cross-subsidy for new Renewable Gas connections would replace or be in addition to the subsidy for new connections already provided under the System Extension Fund (SEF)?

Response:

FEI disagrees with the premise of this IR that there is a cross-subsidy. Please refer to the response to City of Richmond IR1 2.5.

3.0 Reference: Exhibit B-11, Section 7.4.2, p. 100; Section 7.5, p. 106; and Section 8.7, p. 126.

Renewable Gas Connections

Mitigating Risk of Demand and Supply Balancing

On page 100 of the Application, FEI states the following:

> "All Renewable Gas Connections will be designated as low carbon and will be served by a tariff that is tied to the building, rather than the customer. In this way, the building remains on a gas service receiving 100 percent Renewable Gas for its life (as opposed to the service tied to the individual customer who may leave the system at any time)."

On page 106 of the Application, FEI states the following:

> " ... all New Residential Connections will be permanently served with 100 percent Renewable Gas."

3.1 Please confirm that under FEI's proposal Renewable Gas Connections rate, a building must remain on Renewable Gas service for its life as long as it remains connected to the natural gas system, but that buildings will not be required to remain connected to the natural gas system. If not confirmed, please explain how FEI would enforce a permanent connection to the natural gas system.

Response:

Confirmed.

3.2 In light of the BCUC's authority to set rates, and in light of the fact that under Section 75 of the *Utilities Commission Act* the BCUC is not bound by precedent, please explain how the proposed Renewable Gas Connections tariff could be considered "permanent".

Response:

The proposed Renewable Gas Connections tariff will be considered permanent because FEI's BCUC-approved rate schedules for the service will indicate that all new residential connections will be served with 100 percent Renewable Gas for the life of the building. As discussed in the response to BCUC IR1 20.1, FEI has proposed additional language in its proposed rate schedules to provide clarity regarding the permanency of the service.

The BCUC's decision to approve tariffs indicating that the service is permanent for the life of the building would provide a significant signal to the marketplace upon which customers and stakeholders will rely. Although the BCUC is not bound by precedent, any future proposal to change the permanent nature of the Renewable Gas Connections tariff would need to consider the underlying rationale for the BCUC's decision to approve the tariff as being permanent for the life of the building and the reliance placed on that permanence by customers and other stakeholders.

As described in the Application, the rationale for the permanence of the tariff is to support decarbonization of new residential construction for the life of the building and provide a pathway to meeting carbon intensity targets for new residential construction. Customers and many other stakeholders will therefore rely on this permanence in making decisions with respect to the construction of new residential buildings and their energy choices and how they are meeting GHG reductions goals. Given this reliance, FEI cannot foresee circumstances in which it would be just and reasonable for the BCUC to change the permanent nature of the service provided to Renewable Gas Connection customers unless the low carbon nature of the service was maintained. If there were changes to the service generally in the future, existing Renewable Gas Connection customers at that time would need to be grandfathered to preserve their 100 percent Renewable Gas service.

3.3 What does FEI assume to be the life span of a typical new building?

Response:

Please refer to the response to BCUC IR1 19.2.

3.4 Is it FEI's proposal that both the allocation of Renewable Gas to Renewable Gas Connections customers as well as the proposed rate setting approach for Renewable Gas Connections customers would be considered "permanent"?

Response:

Confirmed. FEI's proposed rate setting approach for Renewable Gas Connections service should also be considered permanent, as taking a different approach, whereby the price for new residential connections is different than for existing customers, would be unduly discriminatory. Please refer to the response to BCUC IR1 13.2 which discusses how charging two different rates based on when similarly situated customers commenced service is an unfair vintage pricing approach.

3.5 In the event the cross-subsidy for Renewable Gas Connections service were reduced or eliminated in future, would these customers be able to bypass the purchase of Renewable Gas by acquiring conventional gas from a marketer? How would this be prevented under FEI's proposal?

Response:

FEI disagrees with the assumption in the question that the Renewable Gas Connections service would receive a cross-subsidy. Please refer to the response to BCUC IR1 13.2.

Buildings connected to the gas system under the Renewable Gas Connections service will not be eligible to participate in the commodity unbundling rate schedules under which homeowners can purchase gas from a marketer. Once a building is enrolled for gas service under RS 1PLC, continued participation in that rate schedule is mandatory for as long as the building receives gas service.

3.6 Would FEI shareholders assume the risk for the availability of Renewable Gas or for changes in the allowed cross-subsidization of Renewable Natural Gas for new buildings over their life? If not, how would these risks be allocated between existing and new customers?

Response:

Please refer to the responses to City of Richmond IR1 3.2 and BCUC IR1 13.2 for why FEI's proposed ratemaking approach to Renewable Gas Connections service does not involve a cross-subsidization and should not change for the life of the service.

FEI does not see any material risk with respect to the availability of Renewable Gas to serve Renewable Gas Connections customers. Please refer to Section 6 of the Application.

Any changes to FEI's rates are overseen and determined by the BCUC in accordance with the regulatory compact.

On page 126 of the Application, FEI states the following:

"To manage the variations in demand to ensure both the continuity of the service and the integrity of the offerings, FEI may use several options. These include the following, which are applicable to the Voluntary offerings:

- Explore the potential to increase available supply;
- The use of purchased carbon offsets;
- Pause new enrolments into the Voluntary Program; and
- Service curtailment

3.7 How long would FEI be permitted to rely on offsets?

Response:

For clarity, purchased carbon offsets will not be allowed in the supply of Renewable Gas to Renewable Gas Connections customers. As indicated in Appendix D-2, Tariff Revisions, page 28-3 of the Application, purchased carbon offsets are only admissible for use under the Low Carbon Gas Service and Vehicle Low Carbon Gas Service rate schedules, as well as Long Term Biomethane Contracts. In contrast, Renewable Gas Connections customers will be served under one of the three Permanent Low Carbon Gas rate schedules. These is no time limit on the use of carbon offsets where such purchases are allowed under the tariff.

3.8 What forms of offsets would qualify?

Response:

Please refer to the response to City of Vancouver IR1 1.3.

3.9 Do offset purchases need to be sourced from projects located within British Columbia?

Response:

Please refer to the response to City of Vancouver IR1 1.3.

3.10 How does FEI propose to report annually on its reliance on offsets?

Response:

Please refer to Sections 8.3 and 8.4.2.1 of the Application. Any costs related to the procurement of carbon offsets will be tracked in the LCG Account and reported in FEI's BVA Status Report each year.

3.11 In the event of RG service curtailment, which RG customers would receive priority for receiving available supply? How would the impacts be apportioned between RG customer groups?

Response:

Please refer to the response to BCUC IR1 10.2 for a discussion of how FEI will manage the supply and demand for Renewable Gas.

3.12 In the event of RG service curtailment, how would the rates paid by each of FEI's RG customers be adjusted to account for service curtailment'

Response:

Voluntary Renewable Gas customers who have their service curtailed will be charged for conventional natural gas service instead of the cost of Renewable Gas. If curtailment occurs due to an unforeseen, large-scale reduction in the availability of Renewable Gas supply, any reduced Renewable Gas purchase costs (relative to the initial forecast used for setting the S&T LC rider) will be accounted for in the LCG Account. The reduced supply costs will be factored into the actual versus forecast supply cost true up included in the S&T LC rider setting process. Therefore, in the year subsequent to the initial service curtailment, the S&T LC rider will reflect any impacts to the Renewable Gas supply costs in customer rates.

4.0 Reference: PROPOSED RENEWABLE GAS PROGRAM

Exhibit B-11, Section 7.4.3, p. 102

Modifications to Voluntary Renewable Gas Offering

Environmental Attributes

On page 102 of the Application, FEI notes that under the voluntary program, ownership of the environmental attributes will transfer to the customer.

4.1 Please fill out the below table to indicate whether the environmental attributes associated with renewable gas are retained by FEI or transferred to the customer under the current RNG program, and for the change to the program proposed in the Application.

4.1.1 If there are other options than "retained" or "transferred" (for example, if attributes are transferred to the customer but only if the customer requests) then please include them.

4.1.2 If other rows must be added to the table to accurately capture how environmental attributes are treated, please include them.

Response:

Please refer to the below table which provides the requested information regarding the environmental attributes associated with each offering under the existing and revised Renewable Gas Program.

Table 1: Program Environmental Attributes

	Existing RNG Program	Revised Renewable Gas Program
Voluntary Customers (Excluding NGV)	Transferred to Customer	Transferred to Customer
Voluntary Customers for NGV	Transferred to Customer	Transferred to Customer
Renewable Gas Connections	N/A	Transferred to Customer
Renewable Gas Blend	N/A	Transferred to Customer

4.2 How is FEI ensuring that the environmental attributes associated with RNG and other renewable gases are not double-counted (i.e. are not also being claimed as benefits by other parties), particularly for renewable gases which are sourced in other jurisdictions?

	Current RNG Program	Proposed in Application

Voluntary Customers (excluding NGV)		
Voluntary Customers for NGV		
Renewable Gas Connections	N/A	
Renewable Gas Blend	N/A	

Response:

FEI ensures that the attributes are not double counted through the contractual assurances with the suppliers. Contravening these assurances would create a contractual breach with FEI which could lead to termination of the associated supply agreement. In particular:

- FEI's supply contracts include provisions allocating all attributes to FEI for any volumes it purchases and preclude the sale or use of these attributes by the suppliers in any other market.
- Suppliers must warrant and assure to FEI that they are meeting any obligations related to environmental attributes.
- FEI also has the contractual right to audit facilities which includes the right to review records related to feedstock and emissions specific to the supplier facilities used to determine the overall lifecycle carbon intensity.

The obligations of the supplier combined with the possible threat of losing a contract due to breach are sufficient to ensure emissions are not double counted.

B. RATE DESIGN AND COMPETITIVENESS

5.0 Reference: PROPOSED RENEWABLE GAS PROGRAM
Exhibit B-11, Section 7.4.2.1, p. 101
Benefits of Renewable Gas Connections

On page 101 of the Application, FEI states:

> "FEI's Renewable Gas Connections service maintains access to the natural gas system for the new residential construction sector by providing a gas service for New Residential Connections in alignment with GHG reduction requirements in this sector."

5.1 Is a cross-subsidy necessary to provide "a gas service for New Residential Connections in alignment with GHG reduction requirements in this sector"?

Response:

FEI disagrees with the premise of this question that there is a cross-subsidy proposed for new Renewable Gas Connections. Please refer to the responses to BCUC IR1 13.2 and 16.2. Please also refer to the response to BCUC IR1 10.1 which discusses the objectives of the Renewable Gas Program.

5.2 If new residential buildings must comply with stringent GHG emissions regulations, and purchasing RG may be only one way for them to meet those regulations, please explain why it would be just, fair and reasonable for all sales customers to subsidize these new customers' costs to meet GHG emissions regulations through RNG and not through other means which may have similar or lower societal costs?

Response:

FEI disagrees with the premise of this question that there is a cross-subsidy proposed for Renewable Gas Connections customers. Please refer to the responses to BCUC IR1 13.2 and 16.2.

Further, as discussed in the response to BCUC IR1 13.4, the only choices available for customers are electricity and, if approved, FEI's Renewable Gas Connections service.

Please also refer to the responses to BCUC IR1 17.1, BCSEA IR1 10.3 and 10.4, and City of Vancouver IR1 4.3.

5.3 Please clarify whether the proposed cross-subsidy will benefit developers, consumers or both? Where the cross-subsidy will reduce developer costs, please provide evidence how this will benefit consumers, if at all.

Response:

FEI disagrees with the premise of this question that there is a cross-subsidy proposed for new customers. Please refer to the responses to BCUC IR1 13.2, 13.4, 16.2 and 17.1.

Please refer to the response to City of Richmond IR1 10.4 for a discussion of benefits to the Province as a whole.

5.4 Did FEI consider imposing a connection charge on new residential connections to reduce the cross-subsidy required from existing customers under the proposed Renewable Gas Connections service?

Response:

FEI disagrees with the premise of this question that there is a cross-subsidy proposed for new customers. Please refer to the responses to BCUC IR1 13.2 and 16.2.

FEI has existing charges that apply when customers attach to the system, which recover the cost to set a customer up in the system (the connection charge), the cost of a service line (the SLCA), and the cost of a main extension if required (the MX Test). None of these tests are impacted by changes to the commodity – they reflect the system costs resulting from connecting to service. A different connection charge for new residential Renewable Gas Connections customers would be inappropriate and inconsistent with long-standing ratemaking practices. Connection charges for customers are determined by a separate mechanism and regulatory process. Commodity charges, irrespective of this Application, are recovered from all customers on a rolled in basis. A new customer is not charged the incremental cost of new commodity. This Application mirrors this current practice.

5.5 Under the proposed Renewable Gas Connections service, what incentive would developers of new residential buildings have to pursue other sources of low-carbon

energy that may have lower lifecycle cost than Renewable Gas but do not benefit from the subsidy provided by FEI's existing customers?

Response:

FEI disagrees with the premise of this question that there is a cross-subsidy proposed for new customers. Please refer to the responses to BCUC IR1 13.2, 13.4, 16.2 and 17.1.

As discussed in the response to BCUC IR1 17.1, FEI's proposed Renewable Gas Connections service will not contribute to an uneven playing field amongst low-carbon energy providers. In fact, the playing field is currently tilted away from natural gas including Renewable Gas in favour of electricity and other technologies due to significant incentives and subsidies for heat pumps offered by local and provincial governments and BC Hydro.

5.6 Did FEI consider how the unsubsidized cost of Renewable Gas compares to the costs of other technologies for producing low-carbon thermal energy in new buildings?

Response:

FEI disagrees with the premise of this question that there is a cross-subsidy proposed for new customers. Please refer to the responses to BCUC IR1 13.2, 13.4, 13.7, 16.2, and 17.1.

C. INTERACTION WITH MUNICIPAL PERFORMANCE REQUIREMENTS

6.0 Reference: EVOLUTION OF CLIMATE CHANGE POLICY

Exhibit B-11, Section 7.4.2.1, p. 101

Benefits of Renewable Gas Connections

On page 101 of the Application, FEI states:

> "FEI's proposal ... will meet all existing municipal regulations, restrictions and policy drivers in addition to meeting the pending provincial building code requirements".

6.1 Please provide specific evidence how FEI's proposal would meet all regulations, restrictions and policy drivers in all municipalities, as FEI understands them, where customers receive service from FEI.

Response:

The statement referenced in the preamble was intended to address meeting GHG targets using Renewable Gas. Renewable Gas is one of the cleanest forms of energy for space and water heating available in British Columbia, based on the Province's GHG emissions factors. Moreover, taking into account the lifecycle of Renewable Gas (from source to burner tip, including fugitive emissions), the GHG emissions of Renewable Gas can become negative (see the response to the City of Richmond IR1 12.4). FEI's proposed Renewable Gas Connections service also provides permanence to ensure GHG intensity is maintained for the life of the building.

Please refer to Appendix A of the Application where FEI calculated that 51 to 100 percent Renewable Gas would be required to meet the GHGi targets set out in the various local government regulations. As a result of this analysis, FEI determined that a 100 percent blend of Renewable Gas will meet or exceed local government requirements.

Approval of FEI's proposed Renewable Gas Connections service (i.e., Permanent Connection Low Carbon Gas Service) by the BCUC will enable customers to choose Renewable Gas as an option to meet the GHGi targets set by local governments and the ability for builder/developer/HVAC contractors to install gas equipment in their new residential construction projects.

While the BC Building Code currently does not include any regulations with respect to GHGi, FEI understands that the provincial government is contemplating changes to the BC Building Code to include provisions for local governments to adopt a GHGi metric and that both Renewable Gas and electricity will be energy sources that can be used to meet this metric. Depending on when these revisions are adopted and implemented, future updates to the Renewable Gas Connections service may be required.

Many bylaws and GHGi targets set by local governments were designed at a time when Renewable Gas was not considered a permanent solution due to its voluntary nature and was

therefore excluded from consideration in many cases and there may be some changes required to enable Renewable Gas as a viable option. For example, FEI is aware that the 2022 Vancouver Building By-Law update includes a prescriptive compliance path for new low rise residential construction that electricity is the only option for heating. Additional language may need to be incorporated in the bylaw to demonstrate that Renewable Gas is an option for builders and a reference to the BCUC approved tariff for the Renewable Gas Connections service. As another example, the City of Surrey has incentives for a builder to “not connect to a fossil fuel system”. Even so, FEI believes that the approval of a 100 percent Renewable Gas offering will meet the spirit of this requirement. Where 100 percent Renewable Gas or clean electricity are used as energy inputs in new construction, a building should be considered as meeting low carbon standards.

FEI recognizes that many local governments are not familiar with the implications of FEI’s Renewable Gas proposals and, to date, may not have included Renewable Gas as a pathway to achieving emissions reductions. If the BCUC approves the proposed Renewable Gas Connections service, FEI will further engage with local governments to ensure they understand the offering and why it meets all GHGi requirements. FEI will also continue to work with the Building and Safety Standards Branch to ensure that, if the BC Building Code is updated to provide the ability for local governments to implement GHGi metrics, Renewable Gas is an option.

6.2 Please provide FEI's understanding of the "pending provincial building code requirements", and provide evidence confirming that FEI's proposal will meet the pending provincial building code requirements.

Response:

The reference to the “pending provincial building code requirements" referenced in the preamble is referring to a new provincial carbon pollution standard identified in the CleanBC Roadmap, as described in Section 3.4.1.2 of the Application (reproduced below):

> A new carbon pollution standard will be incorporated into the BC Building Code to support a transition to zero-carbon new buildings by 2030. The standard will be performance-based and will be achieved using renewable and low carbon fuels, including Renewable Gas, in addition to building and equipment standards. Local governments will initially have the option to voluntarily adopt the new carbon pollution standard; however, the provincial government will mandate the standard through provincial regulation starting in 2024. An extract from the CleanBC Roadmap provided below shows, the provincial government has identified Renewable Gas service, as a mechanism to achieve zero-carbon in new construction by 2030:

Zero-carbon new construction by 2030: Current requirements for new construction focus on energy efficiency without directly addressing the issue of GHG emissions. Since natural gas is still a dominant, low-cost energy source for buildings, efficiency requirements alone are not enough to meet our climate targets. That's why we're adding a new carbon pollution standard to the BC Building Code, supporting a transition to zero-carbon new buildings by 2030. We're already working with local governments to develop voluntary carbon pollution standards. Those communities will serve as pilots for future province-wide requirements. The standard will be performance-based, allowing for a variety of options including electrification, low carbon fuels like renewable natural gas, and low carbon district energy. In 2023, we'll review our progress and, based on what we've learned, we'll start phasing in provincial regulations over time (2024, 2027, 2030). We'll also incorporate energy-efficiency standards for existing buildings into the BC Building Code starting in 2024.[2]

6.3 How does FEI propose to meet pending municipal GHG regulations for existing buildings which take service from FEI? Would existing buildings subject to GHG reduction requirements also be able to receive the Renewable Gas Connections rate or would their only renewable gas option be to purchase as Voluntary RG customers?

Response:

FEI has proposed that existing customers will receive Renewable Gas Blend service and, if they wish to have a higher blend of Renewable Gas, can sign up under the Voluntary Renewable Gas service.

Please also refer to the response to City of Richmond IR1 6.1.

[2] https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_roadmap_2030.pdf, page 40.

D. ALTERNATIVE APPROACHES TO THE RENEWABLE GAS PROGRAM

7.0 Reference: RENEWABLE GAS PROGRAM DESIGN

Exhibit B-11, Section 7.3.2, p. 91-93

Identification of Potential Program Design Alternatives

On pages 91-93 of the Application, FEI describes program design alternatives. FEI's discussion of alternatives only addresses the allocation of the environmental attributes from Renewable Gas, and does not discuss alternatives for how customers are charged for Renewable Gas.

7.1 Did FEI consider an approach where new residential customers pay the same renewable gas premium as voluntary customers under the current program? If so, why was this approach eliminated? If not, why not?

Response:

FEI considered and rejected this as a viable option because, as discussed in the response to BCUC IR1 13.2, this would be a vintaged pricing approach for existing customers which would amount to unjust discrimination.

Please refer to the response to BCUC IR1 16.2 regarding how FEI's proposal to set the rate for customers under the Renewable Gas Connections service reflects the rolled-in cost of providing those services, which is: (1) is cost-based and consistent with longstanding ratemaking principles and regulatory, including BCUC, practices; (2) will not result in unjust discrimination; and (3) supports economic efficiency including the efficient use of existing infrastructure to the benefit of all customers.

Please also refer to the responses to BCUC IR1 13.7 and 13.8 for why charging new residential customers a premium, as suggested in this question, would not be feasible.

7.2 Did FEI consider an approach where new residential customers pay the full cost of FEI's renewable gas? If so, why was this eliminated? If not, why not?

Response:

FEI considered and rejected this approach for the same reasons described in the response to City of Richmond IR1 7.1.

E. RNG SUPPLY

8.0 Reference: GROWTH IN RENEWABLE GAS SUPPLY

Exhibit B-11, Section 6.3.2.2, p. 79

Long-Term Supply Forecast: 2027-2032

On Page 79 of the Application, FEI cites multiple studies which estimate the feasible supply potential of renewable natural gas in Canada to be in the range of 61-82 PJs per year by 2030.

8.1 Of this 61-82 PJ of potential Canadian RNG supply, how much is readily accessible (for example, landfill gas or biogas at sewage treatment plans which is already captured)?

Response:

According to the *BC Renewable and Low-Carbon Gas Supply Potential Study,*[3] the feasible Canadian RNG potential is 70 PJ by 2030 and 80 PJ by 2050. However, FEI does not have a breakdown of facilities currently producing and capturing biogas in Canada, but not using it or using it for other purposes.

8.2 Of this 61-82 PJ, how much is already being used beneficially (e.g., for process heat in sewage treatment plants)?

Response:

FEI does not collect information required to precisely identify how much Renewable Gas supply is "being used beneficially"; however, it is likely a small percentage of this available *future* supply.

Electricity generation as well as direct use in applications like wastewater treatment plants can be considered beneficial use. With respect to electric generation, the Canadian Biogas Association estimates that just under 50 percent of all current biogas energy (excluding wood waste) in Canada is for electricity generation.[4] This would be equivalent to approximately 11 PJ of RNG.

Regardless of the current use, it does not preclude these sources from being used as RNG in the future. For example, Ontario cancelled a large number of contracts for electricity generation in 2018, many of which were digester electricity projects.[5] FEI expects that as the contracts expire

[3] Evint Consulting and Canadian Biomass Energy Research Ltd., *BC Renewable and Low-Carbon Gas Supply Potential Study*, January 28th, 2022: https://www.cdn.fortisbc.com/libraries/docs/default-source/news-events/bc-renewable-and-low-carbon-gas-supply-potential-study-2022-03-11.pdf.

[4] https://biogasassociation.ca/about_biogas/projects_canada

[5] https://www.cbc.ca/news/canada/toronto/758-renewable-energy-cancelled-1.4746293

for existing digesters, many will convert to RNG projects. FEI has direct experience with this situation; one of its supply contracts from an Ontario digester is now producing RNG rather than electricity.

With respect to wastewater treatment plants, only about 4 PJ out of a total of 70 PJ[6] (or less than six percent of the total) is accounted for in the potential. This means there would be a maximum of about six percent currently being used beneficially. Even in this category, FEI is seeing a shift toward RNG injection. The Lulu Island wastewater treatment plant is currently injecting RNG, although this is a portion of the gas not being used beneficially already.

Combining the number from the Canadian Biogas Association and the number from FEI's estimate regarding wastewater treatment plants, the existing beneficial use is about 15 PJ, leaving between 46 PJ and 68 PJ of supply today.

Regardless of the beneficial usage, the studies take into account various factors including total available potential supply with a shift in policy toward using biogas as a Renewable Gas in pipelines. Therefore, estimating current potential beneficial use does not change the total potential.

8.3 Of this 61-82 PJ of potential Canadian RNG supply, how much supply can only be accessed once other programs or policy changes have been enacted? Examples may include currently uncaptured landfill gas, potential RNG from agriculture operations which would require different manure management systems, etc.

Response:

FEI is engaged and aware of any policy changes that may impact the potential for RNG supply such as manure management. Today, in FEI's estimation these policies are typically accelerating a transition toward more RNG. For example, stricture manure management policies will push farmers toward solutions such as digestion and treatment of waste so that it can be more readily managed. The additional costs tend to drive toward solutions with potential additional revenue such as RNG projects. Likewise, policies which restrict organics from landfills will typically result in a change from landfill RNG generation to digestion and the generation of RNG.

The potential for RNG of 61 to 82 PJ by 2030 was based on the *BC Renewable and Low-Carbon Gas Potential Study*, which evaluated a range of supply potential studies in Table 4.[7] Under the current GGRR, FEI can acquire approximately 31 PJ of RNG supply. Amendments to the GGRR or potentially new policy frameworks such as the GHG cap for natural gas utilities would open more volume of renewable and low carbon gas to be acquired by FEI. However, there are no

[6] BC Renewable and Low Carbon Gas Supply Potential Study, Table 3, page 23.
[7] Envint Consulting & CBER, B.C. Renewable and Low-Carbon Gas Supply Potential, 2022.

restrictions on accessing supply or a requirement that FEI wait for policy changes before accessing supply from the sources noted in the question.

8.4 How much of this Canadian RNG potential is available for direct injection to gas grids in B.C.?

Response:

According to the *BC Renewable and Low-Carbon Gas Potential Study*, the achievable potential of traditional RNG (from agricultural and municipal wastes) in BC available for direct injection into the gas system is approximately 9.6 PJ by 2050 in the Maximum Scenario. Furthermore, the study concludes that RNG production from wood-based feedstocks could provide an additional 74 PJ by 2050 in the Maximum Scenario.

Please refer to the response to BOCAPO IR1 10.1 for a discussion of how Renewable Gas is delivered by displacement, rather than being directly injected into FEI's distribution system.

8.5 How much natural gas was consumed domestically by residential, commercial and industrial customers in Canada in 2020?

Response:

According to the most up to date information provided by the Canadian Energy Regulator (CER), total consumption of natural gas in 2018 was 4,376 PJ across all sectors and demand types.[8] In the *Canada's Energy Future 2021* report, the CER estimated that total end use for natural gas was 4,185 PJ in 2020, broken down as follows:[9]

- Residential End Use: 703 PJ
- Commercial End Use: 688 PJ
- Industrial End Use: 2,789 PJ
- Transportation End Use: 5 PJ

[8] https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/provincial-territorial-energy-profiles/provincial-territorial-energy-profiles-canada.html

[9] CER – Natural Gas - https://apps.cer-rec.gc.ca/ftrppndc/dflt.aspx?GoCTemplateCulture=en-CA.

8.6 What is the projected growth in natural gas consumption in Canada by 2030 in the absence of major policy changes?

Response:

The CER is currently projecting a slight decline in total end-use natural gas consumption. In particular, in its *Canada's Energy Future 2021: Energy Supply and Demand Projections to 2050* outlook, in the absence of major policy changes (referred to as the Current Policies Scenario),[10] the CER projects total natural gas end-use consumption to drop from 4,276 PJ in 2021 to 4,125 PJ in 2030.

8.7 Please provide a table showing FEI's total throughput volumes (including both commodity sold by FEI, and by others) in PJ for 2020 and projected for 2024, 2028, and 2032 broken out by major customer group: residential, commercial, industrial, NGV, non-NGV LNG, bypass (if not captured already) and any other categories as required.

Response:

As described in Section 8 of the Application, in calculating bill impacts, FEI held constant the number of customers, use per customer and consequently total demand, among other things, so that the resulting bill impacts illustrated the effects of the proposals in the Application. As such, FEI does not have a forecast of the requested items that underpins this Application.

However, FEI has recently filed its 2022 Long Term Gas Resource Plan (LTGRP) which has a number of planning scenarios. The table below includes FEI's 2020 normalized actual results and, for years 2024, 2028 and 2032, the table includes the results from the Diversified Energy Planning (DEP) Scenario that is included in the LTGRP.

FEI does not distinguish between sales service and T-Service within its volume forecasts underpinning the LTGRP. This is because FEI must size resources to deliver gas whether FEI procures the gas on behalf of its customers or customers procure gas themselves. Therefore, FEI did not break out Sales and T-Service volume. Finally, FEI does not forecast bypass customer volume in its LTGRP so has used 2020 actual volume, less known changes, for years 2024, 2028 and 2032.

[10] The CER Current Policies Scenario assumes future policy is fixed at what is in place currently with limited to no uptake of new technologies or trends: https://apps.cer-rec.gc.ca/ftrppndc/dflt.aspx?GoCTemplateCulture=en-CA.

Table 1: FEI's Throughput Volumes

		2020	2024	2028	2032
Rate Schedule (RS) 1 - Residential	PJ	81.6	70.8	66.0	62.1
RS 2, 3, 23 - Commercial	PJ	57.9	64.7	63.9	63.0
RS 4, 5, 25, 6, 7, 27, 22 - Industrial	PJ	56.0	66.0	64.9	64.5
RS 3, 5, 25, 6 - Compressed Natural Gas (CNG)	PJ	1.0	1.3	4.1	7.6
RS 46 - Liquefied Natural Gas (LNG)	PJ	1.7	18.9	47.1	51.5
Subtotal	PJ	**198.1**	**221.8**	**245.9**	**248.7**
Bypass Customers	PJ	36.7	20.2	20.2	20.2
Total	**PJ**	**234.8**	**242.0**	**266.1**	**268.9**

F. OTHER USES OF RG

9.0 Reference: PROPOSED RENEWABLE GAS PROGRAM

Exhibit B-11, Section 7.4.3.2, p. 104

Modification 2: Price of Renewable Gas for Transportation Service and NGV Customers

On page 104 of the Application, FEI states:

> " ... Renewable Gas has a higher value to NGV customers than to other customer types."

9.1 How much of FEI's current RG sales go towards vehicles? Please provide this response both in energy units (PJ or GJ) as well as in terms of a percentage of cur rent RG sales.

Response:

FEI's sale of Renewable Gas to NGV customers for 2021 amounted to 161,153 GJ, or approximately 28 percent of total Renewable Gas sales.

9.2 Assuming NGV customers pay the full unit cost of RNG supply as proposed in the Application, and assuming a BC Low Carbon Fuel Standard credit value of $400 per credit, what is the net cost per GJ to a transportation customer from using RNG instead of conventional natural gas, after factoring in the value of the LCFS credit? Please provide a working spreadsheet showing all calculations.

Response:

In making this calculation, FEI used the natural gas rates applicable under Rate Schedule 5. The cost of Renewable Gas supply is based on the forecasted average cost of supply in 2022 to 2023. At a carbon credit price of $400 per credit, the approximate net cost of delivered Renewable Gas is $4.11 per GJ or $0.16 per Diesel litre equivalent. At a carbon credit price of $400 per credit, the approximate net cost of delivered conventional natural gas is $6.11 per GJ or $0.24 per diesel litre equivalent (DLE).

Please refer to Attachment 9.2 for a breakdown of these cost estimates.

G. RETROFITS/ CONVERSIONS

10.0 Reference: PROPOSED RENEWABLE GAS PROGRAM
Exhibit B-11, Section 7.4.2, p. 100
Renewable Gas Connections

On page 100 of the Application, FEI states:

> "FEI is proposing that all New Residential Connections will receive 100 percent Renewable Gas, where New Residential Connections are all residential dwellings [footnote omitted] served by a service line installed after the date of implementation of the service, including new construction activity, conversions and retrofits."

10.1 Please confirm that FEI's proposal in the Application is that an existing building without a gas service line which decides to fuel switch from another source of energy to gas (for example, from an electric heat pump to a gas-fired furnace) would receive the Renewable Gas Connections rate, as long as the service line is installed after the date that the Renewable Gas Connections service is implemented.

Response:

Confirmed. Please also refer to the response to BCUC IR1 18.2.

10.2 Please confirm that FEI's proposal in the Application is that if an existing building currently connected to a low-carbon district heating system disconnects from that district heating system and installs an on-site gas boiler to take gas service from FEI, that building would receive the Renewable Gas Connections rate, as long as the service line is installed after the date that the Renewable Gas Connections service is implemented.

Response:

Confirmed, assuming the existing building referenced in the question is an eligible residential building, as described in FEI's proposed Rate Schedules. Non-residential buildings are not eligible for the proposed Renewable Gas Connections service.

10.3 Would district heating networks serving new residential customers be permitted to access the Renewable Gas Connections rate for any gas used to serve new residential customers, or is the Renewable Gas Connections rate only intended to benefit direct connections to the FEI natural gas grid?

Response:

District heating networks would not be eligible for the Renewable Gas Connections offering.

However, district energy systems (DES) would have access to Renewable Gas under the proposed Voluntary Renewable Gas service and from other Renewable Gas or renewable energy suppliers.

It is also FEI's understanding that the provincial government is consulting with district energy providers to determine appropriate guidance in setting GHG emissions for DES. The current direction is that local governments should make public GHG emissions factors for the district energy systems operating in their communities and not establish GHG targets for buildings compelled to connect to district energy systems where emissions reductions cannot be reasonably achieved.

10.4 If the Renewable Gas Connections rate is only intended to benefit direct connections to the FEI natural gas grid, please explain how this is in the public interest.

Response:

FEI's proposed Renewable Gas Connections service provides new residential connection customers with a gas based energy option that has been designed in response to both local and provincial climate policy initiatives that are a social benefit and in the public interest.

The Renewable Gas Connections service also benefits all energy consumers in BC, as maintaining the option of using either the gas and/or electricity systems optimizes the use of BC's diversified energy system. As described in Section 4 of the Application, a diversified energy system is in the best interest of British Columbians.

In particular, as society contemplates the optimal pathways and investments needed to achieve BC's low carbon energy future, it is clear that leveraging the existing gas and electricity energy delivery systems is critical. High performing electric and gas delivery systems provides BC with greater flexibility in its energy options, greater affordability for its residents, greater system reliability and resiliency, and allows the optimal energy source to be used for a given application. FEI has more than 50,000 kilometres of existing piped energy delivery infrastructure located

throughout the Province and significant energy storage capacity, which are assets that can be leveraged and are needed to meet peak day and seasonal energy demand.

Transitioning to a lower-carbon future will nonetheless come with increased costs for British Columbians, and FEI remains mindful of the need to continue providing service to its customers while expanding its lower-carbon energy solutions to a broader customer base now and in the future. Maintaining or increasing throughput on the system benefits all customers by ensuring the long-term viability of the gas system, and by mitigating increased energy bills.

Ultimately, without the Renewable Gas Connections service, new residential customers would not have the option of connecting to the gas system as GHGi regulations continue to expand, and the long-term viability of the gas system would be compromised. Neither of these outcomes would be in the public interest.

H. OTHER RENEWABLE GASES

11.0 Reference: GROWTH IN RENEWABLE GAS SUPPLY

Exhibit B-11, Section 6.3.1.2, p. 76; Section 6.3.1.3, p. 77; Section 8.6, Figure 8-3; and Exhibit A-10, BCUC IR 3.1.

Hydrogen Gas and Synthesis Gas

On page 76 of the Application, FEI states:

> "As described in Section 3.6.2, hydrogen presents a significant opportunity to complement RNG in decarbonizing the provincial gas supply."

11.1 What percentage of hydrogen (expressed both in volume terms and in energy content terms) can be injected in the FEI gas grid before major upgrades would be required to the FEI gas grid and end-user appliances? What is expected to be the initial limiting factor for hydrogen blending - FEI's infrastructure or end-user appliances?

Response:

Please refer to the response to CEC IR1 13.1.

11.2 What is FEI's assumed GHG intensity for future hydrogen supply?

11.1.1 What technology or technologies is this based on?

11.1.2 Please explain and provide sources.

Response:

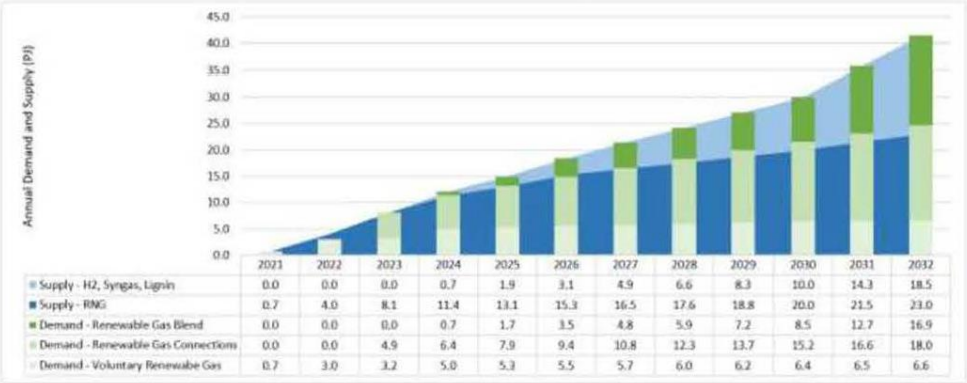
Please refer to the response to BCSEA IR1 3.1.

On page 77 of the Application, FEI states:

> "While synthesis gas is not suitable for direct injection into the natural gas system, it can displace conventional natural gas at a point o f use or be used as a feedstock for upgrading via a methanization process step to create RNG (which can then be injected into the existing natural gas system."

On page 122 of the Application, FEI provides Figure 8-3 as shown below:

Figure 8-3: Forecast Volumes of Renewable Gas Supply, Customer Demand and Allocation to Sales Customers (PJ)



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Supply - H2, Syngas, Lignin	0.0	0.0	0.0	0.7	1.9	3.1	4.9	6.6	8.3	10.0	14.3	18.5
Supply - RNG	0.7	4.0	8.1	11.4	13.1	15.3	16.5	17.6	18.8	20.0	21.5	23.0
Demand - Renewable Gas Blend	0.0	0.0	0.0	0.7	1.7	3.5	4.8	5.9	7.2	8.5	12.7	16.9
Demand - Renewable Gas Connections	0.0	0.0	4.9	6.4	7.9	9.4	10.8	12.3	13.7	15.2	16.6	18.0
Demand - Voluntary Renewabe Gas	0.7	3.0	3.2	5.0	5.3	5.5	5.7	6.0	6.2	6.4	6.5	6.6

11.3 When FEI refers to future synthesis gas supply, is it referring to direct use of synthesis by customers at point of use (without injection into the gas grid), or upgrading into RNG, or a combination? Please provide a chart or table showing the breakdown between these different applications of synthesis gas within FEI's forecast RG portfolio.

Response:

FEI is only referring to direct use of synthesis gas by customers at the point of use without injection into the gas grid. Therefore, FEI has not broken down these different applications of synthesis gas within its forecast Renewable Gas portfolio.

11.4 What is FEI's assumed GHG intensity for future synthesis gas supply?

11.4.1 What technology or technologies is this based on?

11.4.2 Please explain and provide sources.

Response:

Please refer to the response to BCSEA IR1 3.4.

I. GHG INTENSITY

12.0 Reference: PROPOSED RENEWABLE GAS PROGRAM

Exhibit B-11, Section 7.4.2.1, p. 102

Benefits of Renewable Gas Connections

On page 102 of the Application, FEI provides the following table:

Table 7-2: Energy Source Emission Factors

Energy Source	Source of Values	Emission Factor Values		
		$kgCO_{2e}/GJ$	$kgCO_{2e}/kWh$	tCO_{2e}/GWh
Conventional Natural Gas	2020 BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions[105] (Table 1, p. 12)	49.87	0.180	179.53
Biomethane (RNG)	2020 BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions (Table 1, p. 12)	0.2932	0.001056	1.06
Electricity	2020 GGIRCA website (Integrated grid for BC Hydro)[106]	11.14	0.040	40.10

12.1 Please confirm the Emission Factor for Electricity from BC Hydro in the 2020 BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions is 3.0 kg C02eq/GJ or 10.67 tC02eq/GWh.

Response:

Confirmed.

FEI included the *Greenhouse Gas Industrial Reporting and Control Act* (GGIRCA) number in Table 7-2 as the reference, as FEI understands that at the provincial level the GGIRCA emissions factor value is being used as a GHG measure for buildings.

12.2 Please confirm the emission factors for electricity are not fixed but will vary with system conditions and also are expected to decline further with the net zero commitments and regulations for electricity in B.C. and neighbouring jurisdictions.

Response:

Emission factors for electricity may go up or down, for the short or long term, due to a variety of factors including, but not limited to, government policy, cost/arbitrage opportunities for electrical generation, electric generation sources, system load requirements, etc.

Please refer to the below excerpt from the BC Ministry of the Environment and Climate Change Strategy's frequently asked questions document regarding Electrical Emissions Intensity Factors for Grid-Connected Entities (page 1):[11]

> **FAQ: Why do the EEIFs** [Electricity Emission Intensity Factors] **change from year to year?**
>
> In a hydroelectric-based power system such as B.C.'s, GHG emissions from electricity generation can vary significantly from year to year. The quantity purchased by consumers and variations in water supply conditions and reservoir levels impacts this variation. For example, in years with low stream flow and/or low reservoir levels, hydroelectric power must be supplemented through fossil-fuel (thermally) generated electricity, purchased from neighbouring jurisdictions and/or through increased use of B.C. thermal generation facilities, leading to higher provincial GHG emissions. During years with higher stream flow and/or high reservoir levels, less fossil-fuel generated electricity is needed and GHG emissions are relatively lower.

12.3 Please confirm that the emissions factors provided for conventional natural gas and for RNG in Table 7-2 are for burner tip emissions only.

Response:

Confirmed.

12.4 What are the emission factors for conventional natural gas taking into account upstream emissions for conventional natural gas production and transportation (e.g., fugitive methane emissions and emissions associated with energy use for compression stations)?

Response:

The table below captures the life cycle emissions from source to burner tip, including production, processing, transport (including compression), storage (i.e., compression), fugitive emissions, operation, and maintenance of the pipeline. For conventional natural gas, the upstream value

[11] https://www2.gov.bc.ca/assets/gov/environment/climate-change/ind/quantification/electricity_emission_intensity_factors_for_grid-connected_entities_faq.pdf.

below also includes emissions associated with the wellhead and energy required to refine natural gas from fossil gas. For Renewable Gas, the upstream value includes the energy used to move/transport biomass (i.e., diesel) and energy used in processing (i.e., electricity).

Table1: Natural Gas and Renewable Gas Emissions Factors

A	B	C	D
	Upstream kgCO2e/GJ (or g CO2e/MJ	**Burner tip kgCO2e/GJ (or g CO2e/MJ**	**Total Lifecycle kgCO2e/GJ (or g CO2e/MJ**
Renewable Natural Gas (2021)	-22.7	0.2932	-22.4*
Conventional Natural Gas	8.95**	49.87	58.82

* Lifecycle intensity of supplied RNG (2021) was calculated by using the weighted average of the supplied RNG lifecycle intensity as determined using GHGenius, consistent with the BC Low Carbon Fuels Standards requirements and is based on finalized lifecycle intensities assessed by a third party engineering consultant. This source specific RNG supply value differs from the generic value as published by the BC Best Practice to Quantify GHG Emissions value which only considers the end use combustion of the RNG. Please refer to the response to CEC IR1 3.2 for a discussion on how Renewable Gas achieves negative lifecycle emissions.

** Source: 8.951 kg CO2e/GJ based on 2019 upstream data as published by BC Oil and Gas Commission, in combination with other peer reviewed literature based values, factoring in: pipeline transport (compression) + storage (compression) + operation & maintenance + fugitive emissions + energy required to refine natural gas from fossil gas. This value covers wellhead to customer meter, and is based on 100 percent conventional natural gas.

12.5 Does FEI have data on fugitive methane emissions from customer appliance?

Response:

No, FEI does not measure fugitive emissions at the appliance level. However, the lifecycle carbon intensity of Renewable Gas includes fugitive emissions. Please refer to the response to City of Vancouver IR1 5.2 for more information regarding the calculation of carbon intensity and methane leakage.

12.6 What are the emission factors for Biomethane taking into account the emissions released in the production of Biomethane acquired by FEI (e.g., emissions from natural gas and electricity used in upgrading and also methane leakage)?

Response:

Please refer to the response to City of Richmond IR1 12.4.

12.7 Please confirm that the values shown in Table 7-2 are for fuel, and are not adjusted to account for the efficiency of end-use equipment which is used to produce thermal energy.

Response:

Confirmed. FEI understands that emission factors are not normally adjusted to be equipment-specific given their varying efficiencies.

12.8 Please provide a revised version of Table 7-2 which includes the following changes:

- An additional row with the overall average burner-tip emissions factors for gas supplied by FEI (including both conventional natural gas and RG) as of 2020
- Additional columns (or a separate table if needed) showing emission factors for thermal energy from each source assuming an average efficiency of gas boilers of 90% and an average efficiency of electric heat of a) 100% (baseboard) and 300% (representative of a heat pump).

Response:

Please refer to the response to City of Richmond IR1 12.4 for a table showing emission factors breaking down upstream and burner tip emissions for Renewable Gas for 2021.

FEI has provided the requested comparison below, for 2020 and 2021 using both burner tip and lifecycle emissions factors where possible. Please note that the 2021 GGIRCA electricity emission factor does not include upstream emissions from production of fossil fuels used in thermal electric generation.

Table 1: Renewable Gas vs. Electricity Emission Intensity Comparison

A	B	C	D	E	F
Renewable Gas vs. Electricity					
Renewable Gas vs. Electricity	Emission Intensity ($kgCO_{2e}/GJ$)				
	Emission Factor	Efficency			
		140%	96%	100%	200%
	$kgCO_{2e}/GJ$	Gas Fired Heat Pump	Furnace	Electric Baseboard	Electric Air Source Heat
Conventional Natural Gas Burner Tip Emissions	49.87	35.6	51.9		
Renewable Gas (2020) - Burner Tip Emissions of FEI supplied RNG	0.29	0.2	0.3		
Renewable Gas (2020) - Lifecycle Intensity of FEI supplied RNG	-10.30	-7.4	-10.7		
Renewable Gas (2021) - Lifecycle Intensity of FEI supplied RNG*	-22.4	-16.0	-23.3		
Electricity (2020) GGIRCA Integrated Grid	11.14			11.1	5.6
Electricity (2021) GGIRCA Integrated Grid	2.69			2.7	1.3

*subject to change, accurate as of May 1st 2022

12.9 Please provide a revised version of Table 7-2 which includes an additional row with the overall average burner-tip emissions factors for gas supplied by FEI (including both conventional natural gas and RG) as of 2020 and projected for 2024, 2028, and 2032.

Response:

Forecasting average burner tip emissions to 2032 is inherently unreliable as carbon intensity factors for fuels change every year. For example, the carbon intensity factors for both electricity and Renewable Gas dropped in 2021. It is not possible to forecast what the carbon intensities of gas, electricity and Renewable Gas are from year-to-year. However, to provide some information on the impacts of increasing quantities of Renewable Gas, FEI has provided the table below using 2020 burner tip carbon intensities for Renewable Gas (and GGIRCA electric carbon intensities) and the change in mix of renewable versus conventional natural gas in its overall gas supply.

Table 1: Emission Factor Values by Energy Type

		Emission Factor Values		
Energy Source	Source of Values	kgCO2e/GJ	kgCO2e/kWh	tCO2e/GWh
Conventional Natural Gas	Elec - BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions 2020 (Table 1, page 12)	49.87	0.18	179.53
Biomethane (RNG)	Elec - BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions 2020 (Table 1, page 12)	0.2932	0.001056	1.06
Electricity	2020 GGIRCA website (integrated grid for BC Hydro)	11.14	0.040	40.10

		Emission Factor Values		
Energy Source	**Source of Values**	**kgCO2e/GJ**	**kgCO2e/kWh**	**tCO2e/GWh**
Average gas supply - 2024	Assuming a mix of Renewable Gas and conventional natural gas[12]	45.84	0.165	165.01
Average gas supply - 2028		41.80	0.150	150.49
Average gas supply - 2032		36.04[13]	0.130	129.73

Based on current projections, by 2032, this represents over 40 PJ of low carbon gas, which would save ~2 million tonnes CO2e, or 11,000 MWh.

[12] Assumes all emissions factors are constant, and Renewable Gas emissions factor is on average equivalent to the current RNG value.

[13] If 65 PJ of low carbon gas was supplied, the average emissions factor would be 28 kgCO2e/GJ.

J. GOVERNMENT POLICY

13.0 Reference: EVOLUTION OF CLIMATE CHANGE POLICY

Exhibit B-11, Section 3.4.1.1, p. 29; and *BC Climate Change Accountability Act.*

On Page 29 of the Application, FEI describes the provincial government's announced GHG emissions cap for gas utilities:

> "The cap, as laid out in the CleanBC Roadmap, is set at 6.11 Mt of CO_2e per year at 2030. This represents a 47 percent reduction in GHG emissions from 2007 levels ... "

13.1 Please clarify FEI's understanding if this cap is based only on the gas commodity sold by gas utilities, or if it encompasses all gas delivered by gas utilities (i.e., whether it includes GHG emissions associated with gas acquired from gas marketers).

Response:

According to the CleanBC Roadmap, "the cap will be set at approximately 6 Mt of CO2e per year for 2030, which is approximately 47 percent lower than 2007 levels. Since emissions from gas consumption are linked to industry (excluding oil and gas) and the built environment, the cap is consistent with emissions targets for those sectors".[14]

The role and obligations of gas marketers under this policy are unclear at this time.

13.2 Does this cap consider only burner tip emissions or would it include upstream GHG emissions from gas production and distribution?

Response:

Please refer to the response to City of Richmond IR1 13.1.

13.3 Given that FEI is not the only natural gas distribution utility in B.C., please estimate how much of the 6.11 Mt GHG emissions cap in 2030 will be available to FEI.

[14] https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_roadmap_2030.pdf.

Response:

FEI understands that the 2030 GHG emissions cap will include GHG emissions from Pacific Northern Gas. Refer to the response to BCUC IR1 1.1 which estimates the portion of the emissions cap that will be applicable to FEI.

13.4 Relative to FEI's current (2021) emissions that fall under the proposed cap, what percentage reduction in emissions are required to meet the cap?

Response:

Please refer to the response to BCUC IR1 1.1.

13.5 Is FEI aware of any consequences if it does not meet the government's proposed emissions cap (e.g., penalties)? Does FEI anticipate those consequences would be borne by gas consumers or the shareholders of FEI?

Response:

Please refer to the response to Force of Nature IR1 3.

13.6 Please fill in the following table. In addition to the table, please provide commentary on FEI's plan and assumptions for how it will meet the proposed emissions cap.

		2020	2030
FEI Delivery Volume (include all gases sold and/or delivered by FEI)	PJ		
FEI Gas Commodity Sales (Conventional Natural Gas + Renewable Gases)	PJ		
FEI Gas Commodity Sales (Renewable Gas Only)	PJ		
FEI Emissions (as calculated under the proposed Emission Cap)	Mt		

Response:

Please refer to the response to BCUC IR1 1.1.

B.C.'s *Climate Change Accountability Act*, Part 1-Greenhouse Gas Emissions Targets, S. 2.1 states:

> "The following targets are established for the purposes of reducing BC greenhouse gas emissions:
>
> (a) [Repealed 2018-32.2.]
>
> (a1) by 2030 and for each subsequent calendar year, BC greenhouse gas emissions will be at least 40% less than the level of those emissions in 2007;
>
> (a2) by 2040 and for each subsequent calendar year, BC greenhouse gas emissions will be at least 60% less than the level of those emissions in 2007;
>
> (b) by 2050 and for each subsequent calendar year, BC greenhouse gas emissions will be at least 80% less than the level of those emissions in 2007."

13.7 Please describe how FEI intends to achieve the necessary further reductions in its GHG emissions post 2030, to align with BC's legislated GHG emissions reductions targets for 2040 and 2050.

Response:

Please refer to the response to BCUC IR1 1.1 for a detailed explanation of how FEI will comply with the targets out to 2030. FEI is aligned with the provincial government's goals to significantly reduce GHG emissions, while supporting a resilient and reliable energy system and cost-effective GHG abatement.

FEI's plans to achieve emissions reductions after 2030 will be informed by, and subject to, future provincial policy that has yet to be developed by the provincial government. FEI continues to pursue a diversified approach in the reduction of emissions, guided by outcomes from Guidehouse's report titled *Pathways for British Columbia to Achieve its GHG Reduction Goals* (Pathways Report).[15] The Diversified Pathway developed in the Pathways Report achieves 95 percent of the domestic reductions required by 2050 to achieve current provincial targets. The

[15] https://www.cdn.fortisbc.com/libraries/docs/default-source/about-us-documents/guidehouse-report.pdf?sfvrsn=dbb70958_0.

remaining 5 percent of emissions reductions must come from initiatives that target sectors that cannot be modelled for the Province in isolation (e.g., international aviation).

Some key outcomes of the diversified approach include:

- End-use natural gas demand is made up of 73 percent (136 PJ) Renewable Gas (i.e., a mix of hydrogen, RNG and synthesis gas) by 2050.
- 100 percent transition to ZEV light duty vehicles, with a significant role for gases in medium and heavy-duty vehicles.
- Deep energy retrofits where more than 1.7 million homes see significant envelope improvement.
- Approximately 70 percent of buildings use gas heat pumps by 2050.

In addition, the gas system can deliver other benefits related to security, stability, and flexibility that can advance British Columbia's work towards a low carbon future. More details on how FEI will reduce emissions after 2030 are included in FEI's 2022 Long Term Gas Resource Plan.

Attachment 9.2

REFER TO LIVE SPREADSHEET MODEL

Provided in electronic format only

(accessible by opening the Attachments Tab in Adobe)